

To transmit information with the aid of a transmit signal exhibiting a number of frequency-specific subcarriers from a first unit to a second unit via a transmission medium, the frequency-selective transmission characteristics of the transmission medium are determined in the first unit and then the subcarriers of the transmit signal are adapted to the transmission characteristics determined. All subcarriers of the transmit signal can be advantageously modulated with the same number of modulation levels as a result of which maximum utilization of the transmission resources of the transmission medium is achieved.

In the claims:

- 10 On page 30, cancel line 1, and substitute the following left-hand justified heading therefor:

I Claim as My Invention:

Please cancel claims 1-22, without prejudice, and substitute the following claims therefor:

- 15 23. A method for transmitting information via a transmission medium having particular transmission characteristics, with the aid of a multicarrier method, from a first unit to a second unit, the method comprising the steps of:

using a first transmit signal to transmit the information, the first transmit signal exhibiting a plurality of frequency-specific subcarriers;

- 20 determining, in the first unit, frequency-selective transmission characteristics of the transmission medium using a second transmission signal sent out by the second unit, the second transmission signal exhibiting at least one frequency-specific subcarrier; and

- 25 adapting, in the first unit, the plurality of frequency-specific subcarriers of the first transmit signal to the frequency-selective transmission characteristics of the transmission medium which have been determined.

24. A method for transmitting information as claimed in claim 23, the method further comprising the steps of:

determining, in the second unit, the frequency-selective transmission characteristics of the transmission medium;

adapting, in the second unit, to the frequency-selective transmission characteristics of the transmission medium which have been determined, a plurality
5 of frequency-specific subcarriers of the second transmit signal formed with the aid of a multicarrier method and transmitted from the second unit to the first unit.

25. A method for transmitting information as claimed in claim 24,
further comprising the step of:

10 determining at least one of frequency-selective amplitude-specific transmission characteristics and frequency-selective phase-specific transmission characteristics of the transmission medium as the transmission characteristics.

26. A method for transmitting information as claimed in claim 25, the
15 method further comprising the step of:

determining a transfer function of the transmission medium during the step of determining the frequency-selective transmission characteristics of the transmission medium.

27. A method for transmitting information as claimed in claim 26, the
20 method further comprising the step of:

representing the frequency-selective amplitude-specific transmission characteristics of the transmission medium by an absolute value of the transfer function which has been determined.

28. A method for transmitting information as claimed in claim 23, the
25 method further comprising the steps of:

determining the frequency-selective transmission characteristics using both the first and second transmit signals; and

utilizing at least one subcarrier of one of the first and second transmit signals for transmitting at least one pilot signal.

29. A method for transmitting information as claimed in claim 28, the
5 method further comprising the step of:

modulating the at least one subcarrier using a phase modulation method for transmitting the at least one pilot signal, wherein the pilot signal exhibits a particular reference amplitude.

10 30) A method for transmitting information as claimed in claim 25, the
method further comprising the step of:

averaging at least one of the frequency-selective amplitude-specific transmission characteristics and the frequency-selective phase-specific transmission characteristics of adjacent subcarriers of one of the first and second transmit signals for determining the frequency-selective transmission characteristics of the transmission medium.

31. A method for transmitting information as claimed in claim 25, the method further comprising the steps of:

20 determining at least one of time-selective amplitude-specific transmission
characteristics and time-selective phase-specific transmission characteristics of the
transmission medium;

storing a plurality of the frequency-selective amplitude-specific transmission characteristics and frequency-selective phase-specific transmission characteristics, determined over a period of time, in the respective one of the first and second units;

forming, in each case, an average value of the at least one of the stored frequency-selective amplitude-specific transmission characteristics and the frequency-selective phase-specific transmission characteristics; and

adapting the subcarriers of the respective one of the first and second transmit signals to be transmitted to the transmission characteristics of the transmission medium which are averaged over time.

- 5 32. A method for transmitting information as claimed in claim 25, the method further comprising the steps of:

transmitting the determined frequency-selective transmission characteristics from the first unit to the second unit; and

- 10 adapting the frequency-specific subcarriers of the second transmit signal to the transmission characteristics of the transmission medium in the second unit.

33. A method for transmitting information as claimed in claim 32, wherein only changes with time of the transmission characteristics are transmitted by the first unit to the second.

- 15 34. A method for transmitting information as claimed in claim 27, the method further comprising the step of:

- 20 multiplying subcarriers of the first and second transmit signals by one of an inverse of the determined transfer function and an inverse of the absolute value of the determined transfer function in the adaptation of the first and second transmit signals to the transmission characteristics of the transmission medium.

- 25 35. A method for transmitting information as claimed in claim 23, wherein the first and second transmit signals transmitted between the first and second units are transmitted in a time division duplex transmission method.

36. A method for transmitting information as claimed in claim 24, the method further comprising the steps of:

determining, in the determination of the frequency-selective transmission characteristics, a signal power/noise power ratio for each subcarrier of each of the first and second transmit signals; and

utilizing the respective subcarrier of each of the first and second transmit
5 signals for the transmission of information depending on the respective signal power/noise power ratio determined in each case.

37. A method for transmitting information as claimed in claim 36,
wherein, with a signal power/noise power ratio measured below a limit value, the
10 corresponding subcarrier is not utilized for transmitting information.

38. A method for transmitting information as claimed in claim 37, the
method further comprising the step of:

modulating all subcarriers of the first and second transmit signals which are
15 not utilized for transmitting pilot signals by a same number of modulation levels,
wherein the number of modulation levels is determined by a noise power/useful
power ratio determined for the transmission medium.

39. A method for transmitting information as claimed in claim 23,
20 wherein the multicarrier method is implemented by one of an orthogonal frequency
division multiplex transmission method and a transmission method based on
discrete multitones.

40. A method for transmitting information as claimed in claim 23,
25 wherein the transmission medium is one of a wireless radio channel and a line-
connected transmission channel.

41. A method for transmitting information as claimed in claim 40,
wherein the information is transmitted via power supply lines.

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42. A communication system for transmitting information, comprising:
a first unit;
a second unit; and
a transmission medium having particular transmission characteristics, the
5 transmission medium connecting the first and second units for the transmission of
information between the first and second units;
wherein the first unit includes a converter for converting, using a
multicarrier method, the information to be transmitted into a first transmit signal
having a plurality of frequency-specific subcarriers, a transmitter for transmitting
10 the transmit signal via the transmission medium to the second unit, an evaluator for
determining frequency-selective transmission characteristics of the transmission
medium, and an adapter for adapting the frequency-specific subcarriers of the
transmit signal to the frequency-selective transmission characteristics of the
transmission medium.

15 43. A communication system as claimed in claim 42, wherein the
second unit further includes a converter for converting, using a multicarrier method,
the information to be transmitted into a second transmit signal exhibiting a plurality
of frequency-specific subcarriers, an evaluator for determining the frequency-
20 selective transmission characteristics of the transmission medium, an adapter for
adapting the frequency-specific subcarriers of the second transmit signal to the
frequency-selective transmission characteristics of the transmission medium which
have been determined, and a transmitter for transmitting the second transmit signal
via the transmission medium to the first unit.

25 44. A communication system as claimed in claim 42, wherein the
evaluator is designed such that at least one of frequency-selective amplitude-
specific transmission characteristics and frequency-selective phase-specific
transmission characteristics of the transmission medium are determined as the
30 transmission characteristics.